UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/680,665	10/06/2000	Avner Dor	10559-346001 / P8300	9766

20985 7590 02/25/2004

FISH & RICHARDSON, PC
12390 EL CAMINO REAL
SAN DIEGO, CA 92130-2081

EXAMINER	
DO, CHAT C	

ART UNIT	PAPER NUMBER
2124	9

DATE MAILED: 02/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PRG

Office Action Summary	Application No. 09/680,665	Applicant(s) DOR ET AL.	
	Examiner Chat C. Do	Art Unit 2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *9-13* is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is responsive to Amendment A, 1/7/2004.

2. Claims 1-13 are pending in this application. Claims 1 and 9 are independent claims. In Amendment A, claims 1 and 9 are amended and claims 14-15 are cancelled. This action is made final.

Claim Objections

3. Claim 1 is objected to because of the following informalities:

Re claim 1, the phrase "above the" in line 7 should replace with "in a".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 1, it is mis-descriptive by the limitation "normalizing each column of said matrix, based on duplicate rows, and marking said duplicate rows as omitted rows". For examination purposes, the examiner considers this limitation as normalizing each column of matrix based on the duplicate/omitted columns as grouping.

Thus, claims 2-8 are also rejected for being dependent on the rejected base claim 1.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being obvious over Steven ("Linear Algebra with Application").

Re claim 1, Steven discloses a method comprising: receiving a digital communication signal; arranging digital communication signal into an rxn matrix (some cited problems in Steven's book involve with analyzing digital communication signals as imaging); linear transforming the rxn matrix of at least one n-dimensional input vector in a real or complex or a finite field (page 251 wherein the discrete signals are collected in finite field) by: omitting zeros columns of matrix and corresponding scalar components of the input vector; normalizing each column of matrix, based on duplicated rows, and marking duplicate rows as omitted rows (equations d_k and w_k in page 251 wherein the w_k for the first row of matrix is $1 = e^{-0*kx}$); generating a modified vector from groups in the normalized matrix (F_4); generating a modified matrix(F_4P_4); and generating a modified matrix and obtaining the output vector (d_4 in page 253) as indicative of digital communication. Steven does not disclose a step of storing in memory information about omitted rows in the matrix that are duplicate of other rows in the matrix and rows in the

matrix which includes information that is not duplicated in other rows. However, the examiner takes an official notice that the step of storing in memory information about omitted rows in the matrix that are duplicate of other rows in the matrix and rows in the matrix which includes information that is not duplicated in other rows is well known in the art. In linear algebra, if there is a duplicate row or expression in matrix, it can be safely removed that duplicate row or expression in the matrix without affecting solving step(s) or result because the system with duplicate row(s) or expression would be over-determined. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to stored in memory information about omitted rows in the matrix that are duplicate of other rows in the matrix and rows in the matrix which includes information that is not duplicated in other rows in Steven's invention because it would enable to simplify and reducing the step of processing the signal which increases the system performance.

Re claim 2, Steven further discloses in pages 250-253 comprising splitting the transformation matrix into several sub-matrices and obtaining the output vector by unifying the output vectors resulting from the products of each sub-matrix (the large matrix F_4P_4 is sub-divided into four blocks as seen in section "The Fast Fourier Transform" in pages 252-253).

Re claim 3, Steven further discloses in page 250-253 the modified matrix encompasses a subset of rows of transformation matrix (F_4P_4 encompasses all the subset of rows of F_4 in page 252).

Re claim 4, Steven further discloses in page 253 comprising splitting the input vector into several sub-vectors such that each sub-vector corresponds to a sub-matrix and wherein the output vector is obtained by adding the output vectors resulting from the products of each sub-matrix (four w input components are break-down into two set of two input components w1 and w2 as seen in d_4 equation in page 253).

Re claim 5, Steven further discloses in page 253 comprising splitting a modified matrix into several sub-matrix, wherein an output vector is obtained by adding the output vectors resulting from the products of each sub-matrix, by the respective sub-vector (d_4 is obtained by adding the result of q1 and q2; subtracting q2 from q1 in page 253).

Re claim 6, Steven does not disclose a step normalizing each column of matrix by multiplying the column by the inverse of a lead element. However, it is well known in the art the step of converting complex number "j" into unity "1", one must multiply "j" by its inverse "-j". Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a step of converting a complex number into unity by multiplying it with its inverse because it would enable to reduce the hardware circuitry and computation complexity of normalizing the complex number.

Re claim 7, Steven further discloses in page 252 the output vector is a product of the matrix and the input vector ($d = F_N z = F_N P_N w$).

Re claim 8, Steven further discloses in page 253 comprising identifying groups of equal columns in the normalized matrix and attaching a unique location to each identified group (final d equation).

Response to Amendment

8. The amendment filed 1/7/2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the new limitation "based on duplicate rows, and marking said duplicate rows as omitted rows" in claim 1 lines 15-16. The applicant does not point out in the argument where the original specification supports this new limitation.

Applicant is required to cancel the new matter in the reply to this Office Action.

Allowable Subject Matter

9. Claims 9-13 are allowed.

Response to Arguments

10. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2124

February 23, 2004

KAKALI CHAKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100